

## WORK FLOW SYSTEM AND CLIENT IN WORK FLOW SYSTEM

### BACKGROUND OF THE INVENTION

The present invention relates to a work flow system which converts documents such as a Ringi-sho (request for decision) and report into digital form, and circulates them on the network, and relates also to the client of above-mentioned work flow system.

In recent years, proposal has been made for introduction of a work flow system where circulating services of a Ringi-sho (request for decision), report and the like are provided digitally on the network in corporate organizations. When a destination and the order of circulation are preset in this kind of a work flow system, automatic circulating of the document in that order is executed; not only that, an effective approval of the Ringi-sho (request for decision) and the like is ensured when each

circulation sender sets the approval/non-approval for the document to be circulated.

However, the prior art work flow system has assumed circulating of a document on the closed network of a client server system, and this service has been provided in the form of a server program. Namely, a shared directory is installed within a specific file server, and each client relevant to circulating accesses a file server. In such a form, the control of the circulation sender must always be monitored and recorded by a circulating management server. Further, such a prior art system has required a circulating management arrangement which provides independently management of the right of access to a document per se to be circulated and a shared directory. Moreover, the progress of circulating must be also monitored by the circulating management server. The prior art is accompanied by the following problems under these circumstances:

- 1) A purpose-built server for circulating management and a file server for setting a shared directory are essential.
- 2) Each client accesses the aforementioned server to circulate information with reference to the aforementioned file server, and all management work must be made by the

server until termination of circulating, with the result that the server load is much increased.

- 3) Access to the server from the external network (different LAN, the Internet, etc.) is normally restricted by the Firewall and the like. This makes it difficult carry out circulation to the client connected to the external network.
- 4) If a document is circulated to the client of the external network, confidentiality may be violated.

#### **SUMMARY OF THE INVENTION**

The first object of the present invention is to solve the above-mentioned problems, and to provide a work flow system capable of;

- (1) reducing the server load by circulating of a document file without using the purpose-built circulating management server,
- (2) constructing a circulating network for clients connected to different LANs and the Internet independently of the restriction of the Firewall, and
- (3) ensuring each circulating of a document file.

Further, another object of the present invention is to provide is to a work flow system capable of;

- (1) circulating of a document file between clients by sending a circulating information file together with the document file,
- (2) performing circulating management by means of a purpose-built server by including various types of information in a circulating information file, and
- (3) having more powerful functions.

A further object of the present invention is to provide a work flow system which allows the state of circulating to be recognized by each client by sending to other clients a report that a document file has been sent to the next client, even if this document file is circulated among clients without passing through a circulating management server.

Still another object of the present invention is to provide a work flow system which allows the state of circulating to be recognized by each client by sending a report to other clients that a document file has been sent to the next client, even if this document file is circulated among clients without passing through a circulating management server.

A still further object of the present invention is to provide a work flow system which allows the status of circulation to be identified and, at the same time, allows

the state of circulation to be sent back in response to an inquiry from the client, even in the server which does not perform circulating management by sending to other clients a report that a document file has been sent to the next client.

A still further object of the present invention is to provide a work flow system which allows a document file to be circulated to a client connected to the external network without any fear of confidentiality being violated, by encryption of a document file to be sent.

A still further object of the present invention is to provide a work flow system which allows a document file to be circulated among clients without going through a circulation management server, by sending a circulation information file together with a document file and which, further, provides circulation management on a server or provides more powerful functions by constituting a transmission button display means, storage button display means, verification result input means, expedition message display means, transmission completion reporting means or transmitted document encryption means for clients.

To solve the aforementioned problems, the present invention provides the following structure:

(1) A work flow system for circulating a digital document file to multiple clients through the network comprises;

a transmission client for issuing the first circulation document file further comprising:

a) a setup processing means for setting destination information to specify destination and order of circulation, and

b) a transmission processing means for sending a circulation information file including the aforementioned destination information and the aforementioned document file to the next circulation client set on the aforementioned destination information; and

multiple clients for sequential circulation of the document file transmitted by the aforementioned transmitting client, further comprising:

a) a transmission processing means for sending the aforementioned circulation information file and the aforementioned document file to the next circulation client set on the aforementioned destination information, in conformity to the verification of a document file.

(2) In a work flow system for circulating a digital document file to multiple clients through the network, each client comprises;

a) a setup processing means for setting destination information to specify destination and order of circulation, and

b) a transmission processing means for sending a circulation information file including the aforementioned destination information and the aforementioned document file to the next circulation client set on the aforementioned destination information; wherein the aforementioned circulation information file includes the information on destination of transmission completion report, and, at the same time, the aforementioned document file and circulation information file the circulation client having sent to the next circulation client sends a transmission completion report, apart from the aforementioned document file, to the aforementioned report destination based on the aforementioned report destination information.

(3) A client in a work flow system for circulating a digital document file through the network comprises;

a) a setup processing means for setting destination information to specify destination and order of circulation, and

b) a transmission processing means for sending a circulation information file including the aforementioned destination information and the aforementioned document file to the next circulation client set on the aforementioned destination information; wherein the aforementioned circulation information file includes the information on destination of transmission completion report. Further, the aforementioned document file and circulation information file the circulation client having sent to the next circulation client sends a transmission completion report, apart from the aforementioned document file, to the aforementioned report destination based on the aforementioned report destination information.

(4) A software product for circulating a digital document file through the network comprises;

a) a setup processing means for setting destination information to specify destination and order of circulation as circulation information file,

b) a first transmission processing means for sending the aforementioned circulation information file to the next circulation client set on the aforementioned destination information, and



c) a second transmission processing means for sending a transmission completion report to a specific server based on the aforementioned report destination information, wherein the aforementioned circulation information file includes the report destination information on the report destination of the transmission completion report.

(5) In a work flow system for circulating a digital document file on the network accessed by multiple clients, the circulation information file related to circulation of the aforementioned document file together with the aforementioned document file is sent and circulated on the network.

(6) In a work flow system for circulating a digital document file on the network accessed by multiple clients, the client having received the aforementioned document file sends a verified document file to the next client in conformity to the verification of a document file, and sends a transmission completion report to that effect to other clients.

(7) In a work flow system for circulating a digital document file on the network accessed by multiple clients, the last client where the aforementioned document file is circulated sends a circulation completion report to other clients to notify termination of circulation, in conformity to the verification of a document file.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram representing the configuration of work flow system hardware;

Fig. 2 (A) is a block diagram representing the circulation file configuration, and Fig. 2 (B) is a block diagram representing the report file configuration;

Fig. 3 is a block diagram representing the client software configuration;

Fig. 4 is a block diagram representing the server software configuration;

Fig. 5 is a ladder diagram representing the operation of a client in a work flow system; and  
Fig. 6 is a ladder diagram representing the operation of a server in a work flow system.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The following describes the details of the embodiments according to the present invention with reference to drawings:

Fig. 1 is a block diagram representing the configuration of work flow system hardware as an embodiment according to the present invention.

As shown in Fig. 1, hardware of the work flow system as an embodiment of the present invention comprises a network 3 such as LAN connected with server 1 and multiple clients 2, and an Internet 5 connected with multiple networks 3 via a gateway 4. The aforementioned server 1 and client 2 comprise;

an information processor 6 for processing digital information,

a display unit 7 for displaying digital information,

an input unit 8 for inputting digital information,

storage unit 9 for storing the file which can be read by the aforementioned information processor 6,

and a network access unit 10 for connecting the

aforementioned information processor 6 with the network 3.

Fig. 2 (A) is a block diagram representing the circulation file configuration of a work flow system. This circulation file consists of;

a document file including a circulation document such as a digital Ringi-sho (request for decision) and a report, and a circulation information file containing various types of information related to circulation.

The aforementioned circulation information file comprises;

(1) destination information for specifying a destination,

- (2) information on the order of circulation for specifying the order of circulation,
- (3) proxy circulation destination information for specifying a proxy for each destination,
- (4) report destination information for specifying a destination when reporting transmission completion and disabled circulation,
- (5) storage destination information for specifying a destination for storage of a circulation completion document file,
- (6) original information for specifying the source from which the original document file is stored,
- (7) time limit information for specifying the time limit for circulation,
- (8) approval requirement/non-requirement information for specifying whether or not it is necessary to request each client 2 for approval operation,
- (9) verification history information for recording verification results (approval result) of the document file in each client 2, and
- (10) correction history information for recording corrections of a document file in each client 2.

Fig. 2 (B) is a block diagram representing the report file configuration in a work flow system. This report file comprises;

- (1) a transmission completion report file for reporting to another client 2 (or server 1) that a circulation file has been sent to the next circulation client 2,
- (2) a circulation completion report file for reporting to another client Z (or server 1) that the last client 2 has stored the document file at a specified storage site, and
- (3) a disabled circulation report file for reporting to another client Z (or server 1) that circulation to the next circulation client 2 is disabled. Each report file contains at least a circulation document information for specifying a circulation document and a report source information for specifying a source of report.

Fig. 3 is a block diagram representing the software configuration in the aforementioned client 2. The aforementioned software comprises a circulation transmission setting processor 11, circulation/report reception processor 12, circulation time limit processor 13, display/correction processor 14, verification/approval processor 15, circulation transmission processor 16, transmission completion report processor 17, document storage processor 18, circulation

completion report processor 19, circulation delete processor 20, disabled circulation report processor 21, selection/transmission processor 22, disabled circulation report processor 23, inquiry processor 24, etc. The following describes the processing of each processors 11 and 24 one after another.

The circulation transmission setting processor 11 is operated in a transmitting client 2 which first sends a circulation file. On the setting screen displayed on a display unit 7 by the aforementioned circulation transmission setting processor 11, it is possible to freely set the aforementioned destination information, information on the order of circulation, report destination information, storage location information, original information, time limit information and approval requirement/non-requirement information, in addition to designation of a circulation document. Upon termination of this setting work, the file to be circulated (document file and circulation information file) is generated in conformity to the aforementioned settings. The generated circulation file is sent to the first circulation client 2 specified based on the aforementioned destination information and order of circulation information by the circulation transmission

processor 16 to be described later. The circulation file is directly sent and received among clients. For example, a transmission destination address (IP address, etc.) can be specified based on circulation destination information, and can be sent on a pier-to-pier basis.

The circulation/report reception processor 12 is configured to receive a circulation file or report file, and, at the same time, to store the receiving file in the aforementioned storage unit 9. Further, when the receiving file is encrypted, the encrypted file is decoded based on a preset decoding key, and is then stored in the storage unit 9.

The circulation time limit processor 13 is configured to refer to the time limit information included in the circulation information file of the received circulation file and. If the aforementioned time limit information has expired, the message of prompting verification and approval of the document file included in the circulation file is displayed on the aforementioned display unit 7.

The display/correction processor 14 ensures that the document file included in the received circulation file is displayed on the aforementioned display unit 7. Further, if the displayed document file has been corrected by the

circulation sender, the contents of correction are to added to the correction information of circulation information file.

Based on the approval requirement/non-requirement information included in the circulation information file of the received circulation file, the verification/approval processor 15 determines whether approval is required or not. If approval is not required, a verification button is displayed in a part of the document file display screen. If approval is required, both approval button and non-approval button are displayed. Further, if any one of the buttons is operated, the result of the operation is added to verification history information of the circulation information file.

Based on the circulation destination information and order of circulation information included in the circulation information file of the circulation file, the circulation transmission processor 16 specifies the next circulation client 2 and, at the same time, displays a transmission button on the display unit 7. It sends the circulation file to the next circulation client 2 in conformity to the operation of the aforementioned transmission button. Further, when the next circulation client 2 is a client 2



outside the same network, it is transmitted subsequent to encryption of the circulation file (document file) based on the preset encryption key.

When transmission of the circulation file by the aforementioned circulation transmission processor 16 has correctly terminated, the transmission completion report processor 17 specifies the client 2 (or server 1) to which report is to be sent, based on the report destination information included in the circulation information file of the circulation file. Then it sends a transmission completion report file to the aforementioned report destination notifying that the circulation file has been sent to the next circulation client 2. This report file can be send to the mail server inside the network. In this case, the report file is sent as an electronic mail or a file attached thereto to the electronic mail address of the client of the partner. The electronic mail stored in the mail box inside the server is referred to by the client of the partner whenever necessary, whereby the partner client recognizes that the circulation information file is addressed to itself.

The document storage processor 18 performs its function when the circulation client 2 having received the circulation file is the last destination. In the aforementioned document

storage processor 18, the client 2 (or server 1) for storing the circulation file is specified based on the storage location information included in the circulation information file of the circulation file. Further, the circulation file is stored (sent) to the aforementioned storage location. If when the storage source of the original document file is set in the original information included in the circulation information file of the circulation file, the original document file is obtained from the aforementioned storage source. At the same time, the aforementioned original document file is stored in the aforementioned storage location.

When storage (transmission) of the circulation file by the aforementioned document storage processor 18 has correctly terminated, the circulation completion report processor 19 specifies the client 2 (or server 1) to which report is sent, based on the report destination information included in the circulation information file of the circulation file. At the same time, the circulation completion report file is sent to this report destination notifying that the circulation file has been stored in the storage location. This circulation completion report file

can be sent by electronic mail, similarly to the  
aforementioned transmission completion report file.

The circulation delete processor 20 is operated by the  
client 2 having received the aforementioned transmission  
completion report file or circulation completion report file.  
Of the circulation files stored in storage unit 9, those  
corresponding to the aforementioned report file is deleted or  
can be deleted in the aforementioned circulation delete  
processor 20.

When transmission of the circulation file by the  
aforementioned circulation transmission processor 16 has  
failed to terminate correctly, the disabled circulation  
report processor 21 specifies the client 2 (or server 1) to  
which report is sent, based on the report destination  
information included in the circulation information file of  
the circulation file. At the same time, a disabled  
circulation report file is sent to the aforementioned report  
destination notifying that the circulation file cannot be  
sent to the next circulation client 2. As described above,  
the aforementioned report file can be sent as an electronic  
mail or an file attached thereto.

When transmission of the circulation file by the  
aforementioned circulation transmission processor 16 has

failed to terminate correctly, the selection/transmission processor 22 specifies the proxy client 2 of the next circulation client 2, based on the proxy destination information included in the circulation information file of the circulation file. Further, the circulation clients 2 are specified one after another based on the destination information and information on the order of circulation. Further, the aforementioned two specified clients 2 are displayed on the display unit 7, and selection of one of them is prompted. Then the circulation file is sent to the selected client 2.

The disabled circulation report processor 23 is operated by the client 2 having received the aforementioned disabled circulation report file. Based on information included in the disabled circulation report file, the client 2 of disabled circulation is specified in the aforementioned disabled circulation report processor 23. Then a message is indicated on the display unit 7 to notify that circulation is disabled on the aforementioned client 2.

The inquiry processor 24 is enabled when the server 1 is set to the report destination of the report file. The inquiry file is sent to the server 1 in the aforementioned inquiry processor 24 in conformity to the specified

operation. Further, a reply file returned from the server 1 is received to indicate this reply file on the display unit 7.

Fig. 4 is a block diagram representing the software configuration in the aforementioned server 1. This software comprises a receiving processor 25, storage processor 26, report storage processor 27 and circulation status reply processor 28. The following describes the operations of processors 25 and 28:

The receiving processor 25 is arranged to receive a storage circulation file, report file or inquiry file. When a receiving file is encrypted, the encrypted file is decoded based on a preset decoding key. Here the circulation file for storage corresponds to the aforementioned document file and circulation information file including the circulation document.

Further, when a file (circulation file for storage, report file or inquiry file) has been sent by electronic mail as described above, the aforementioned receiving processor 25 is capable of performing the following processing according to each report file inside the mail box of the server:

The storage processor 26 is operated when the circulation file for storage has been received. In the

aforementioned storage processor 26, a received file for storage is stored in the predetermined area of the storage unit 9.

The report storage processor 27 is operated upon receipt of a report file (including the file for transmission completion report, circulation completion report or disabled circulation report). The received report file is stored in the predetermined area of the storage unit 9 in the aforementioned report storage processor 27.

The circulation status reply processor 28 is operated upon receipt of an inquiry file. In the aforementioned circulation status reply processor 28, reference is made to the report file of the circulation document related to inquiry. Further, based on the aforementioned report file, it specifies up to what client 2 the circulation document has been circulated or which client 2 has verified the circulation document at present. The specified circulation status information is sent as a reply to the client 2 which has made inquiry.

It should be noted that the data in the mail header can be used to detect such an electronic mail. Further, in the aforementioned software on the client side it is also

possible to assign a specific data in the mail header when an electronic mail is sent.

Fig. 5 is a ladder diagram representing the operation of client 2 in a work flow system. This latter diagram shows the case where circulation is carried out among (1) a transmitting client 2A, (2) a circulation client 2B linked to the aforementioned transmitting client 2A via the network 3 (LAN), (3) a circulation client 2C linked to the aforementioned circulation client 2B via the Internet 5, and (4) a circulation client 2D linked to the aforementioned circulation client 2C via the network 3 (LAN). The following describes the operations for clients 2A to 2D one by one.

In the transmitting client 2A, the document to be circulated is created or specified, and, at the same time, the following information is set: circulation information such as circulation destination information, information on the order of circulation, proxy destination information, report destination information, storage location information, original information, time limit information and approval requirement/non-requirement information. After that, when the transmission button displayed on the screen is pressed, the circulation file including the document file and circulation information file is sent to the circulation

client 2B. Further, when this transmission has terminated correctly, the transmission completion report file is set to the clients 2B, 2C and 2D. Here the circulation file is directly sent to the circulation client 2B. As will be described later, the transmission completion report file is assigned with the electronic mail addresses of circulation clients 2B, 2C and 2D, and is sent to the server in the form of an electronic mail.

Upon reception of the circulation file in the circulation client 2B, this file is stored in the storage unit 9. At the same time, the document file is displayed on the display unit 7 to prompt verification or approval operation. The result of this operation is added to the verification history information of a circulation information file. When the transmission button given on the screen is pressed after that, the circulation file is sent to the circulation client 2C. The aforementioned circulation client 2C is connected to an external network, so the circulation file is sent to the circulation client 2C after having been encrypted. Further, when this transmission has correctly terminated, the transmission completion report file is sent to client 2A, 2C and 2D.



The encrypted circulation file can be sent, for example, to the circulation client 2C through the FTP server of the external network. In this case, it can be sent to the FTP server using a password.

Upon receipt of a circulation file, it is decoded in the circulation client 2C, and is then stored in the storage unit 9. At the same time, the document file is indicated on the display unit 7 to prompt the operation of verification or approval. The result of this operation is added to the verification history information of the circulation information file. When the transmission button shown on the screen is pressed after that, the circulation file is sent to the circulation client 2D. Further, when this transmission has correctly terminated, the transmission completion report file is sent to client 2A, 2B and 2D.

Here a circulation file can be sent just as it can be sent from the aforementioned circulation client 2A to the 2B. The transmission completion report file is assigned with electronic mail addresses of the circulation clients 2A, 2B and 2D, and is sent in the form of an electronic mail. Because of the form of an electronic mail, the report can be to the corresponding circulation client without fail

independently of whether the network is an external network or not.

Upon receipt of a circulation file, it is stored in the storage unit 9 in the circulation client 2D. At the same time, the document file is indicated on the display unit 7 to prompt verification or approval operation. The result of this operation is added to the verification history information of a circulation information file. In the circulation client 2D as a final sender, a storage button is displayed subsequent to the operation of verification, and the circulation file is sent to the predetermined storage location in conformity to the operation of the aforementioned storage button. Further, when this transmission has correctly terminated, the circulation completion report file is sent to clients 2A, 2B and C by electronic mail and the like. In clients 2A, 2B and C having received it, the circulation file stored in the storage unit 9 is automatically deleted. Further, as the circulation completion report file is transmitted, the circulation file stored in the storage unit 9 is automatically deleted.

Fig. 6 is a ladder diagram representing the operation of a server 1 in a work flow system. Similarly to the ladder diagram of Fig. 5, this block diagram shows the operation

when server 1 is designated as a report destination of the transmission completion report file and the like in circulation among the clients 2A to 2D. Server 1 can use a mail server, for example. In this case, each file can be sent in the form of an electronic mail or file attached thereto.

Namely, upon receipt of a report file (including the file for transmission completion report, circulation completion report or disabled circulation report), the server 1 stores the received report file in the predetermined area of the storage unit 9. Further, when clients 2A to 2D send an enquiry file to the server 1, reference is made to the report file of the circulation document related to the inquiry. At the same time, based on the report file, it specifies up to what client 2 the circulation document has been circulated or which client 2 has verified the circulation document at present. The specified circulation status information is sent as a reply to the client 2 which has made inquiry.

In the embodiment of the present invention arranged in the above configuration, a circulation sender and the order of circulation are set in advance in the work flow system, and the document is automatically circulated in that order.

The Ringi-sho (request for decision) and the like are approved by each circulation sender setting the approval/non-approval for the document to be circulated. The work flow system according to the present invention includes a transmission client 2 for issuing the first circulation document file and multiple clients 2 for sequential circulation of the document file transmitted by the aforementioned transmitting client 2. The aforementioned transmitting client 2 sets the circulation destination information for specifying the circulation destination and the order of circulation. At the same time, the circulation information file including the circulation destination information and document file are sent to the next client 2 preset in the aforementioned circulation destination information, and are stored in the storage unit 9 of the circulation client 2. Upon receipt of the aforementioned circulation information file and document file, the circulation client 2 sends the aforementioned circulation information file and document file to the next circulation client 2 preset in the circulation destination information in conformity to the verification of the document file, and stores them in the storage unit 9 of the circulation client 2. The circulation file is directly exchanged among

circulation clients. Transmission on a pier-to-pier basis is one of the methods available.

Accordingly, a circulation information file for specifying the circulation destination is also sent with the document file. Sequential circulation of document files among clients is enabled without passing through the conventional server for circulation management, and there is no need of circulation management by a server, with the result that server loads have been reduced. Moreover, for the client 2 connected to different LANs and Internet 5, it has become possible to configure the circulation network immune to the restriction by the Firewall, and circulation of the document file has been facilitates.

Having sent the aforementioned document file and circulation information file to the next circulation client 2 (including the storage location), the circulation client 2 sends the transmission complation report file (including the circulation completion report file) indicating that it has sent it to the next circulation client 2 to another circulation client 2 or transmitting client 2. This can be realized by transmission of an electronic mail to the specified server, for example, a mail server.

Accordingly, while the document file is circulated among clients 2 without passing through the server for circulation management, the status of circulation can be identified by each client 2. Moreover, the transmitting client 2 can freely set the aforementioned report destination (for example, transmitting client 2 or the previous circulation client 2). This makes it possible to avoid the disadvantage of increasing the processing load of the client 2 by indiscriminate transmission of transmission completion report files to all clients 2.

Further, the aforementioned report destination is a server 1 supervising circulation of the documents file, and the circulation client 2 having sent the aforementioned document file and circulation information file to the next circulation client 2 sends the transmission completion report file (including the circulation completion report file and disabled circulation report file) to the server. This arrangement permits the status of circulation to be identified even in the server 1 which does not manage circulation. Not only that, the circulation status information can be returned in response to an inquiry from the client based on the aforementioned transmission completion report file. Further, unloading or downloading of

the circulation file proper to the server 1 is not required, and this signifies a substantial improvement of the traffic in a specific server.

Further, upon receipt of the aforementioned transmission completion report file (including the circulation completion report file), the circulation client 2 or transmitting client 2 deletes or makes it possible to delete the aforementioned document file and circulation information file stored in the aforementioned storage unit 9. This avoids the disadvantage that the document file and circulation information file unnecessary to the storage unit 9 of the client 2 are accumulated.

Further, the last circulation client 2 stores the aforementioned document file in the predetermined storage location. While document files are circulated among clients 2 without passing through the server for circulation management, verification of the circulation completion document is facilitated. Further, when the circulation completion document file is stored, the original document file can be obtaining and stored, with the result that the reliability of the storage document is improved.

Further, the aforementioned circulation client 2 adds the history information including the result of verifying the

document file to the aforementioned circulation information file, and sends it to the next circulation client 2. While document files are circulated among clients 2 without passing through the server for circulation management, Ringi-sho (request for decision) or other documents accompanying approval can be circulated. Moreover, whether a document file requires approval operation or not can be set freely.

This avoids the disadvantage of increasing the load of the circulation sender by requesting the operation of approval even for the document file which does not require approval.

Further, when the time limit of time limit information including the aforementioned circulation information file has expired, the aforementioned circulation client 2 prompts the verification of the aforementioned document file, thereby preventing a substance delay of circulation. Moreover, the transmitting client 2 can set the aforementioned circulation time limit freely, and this meets the requirements for urgent circulation.

Further, the aforementioned circulation client 2 or transmission client 2 permits encryption of the document file to be transmitted, whereby a document file can be sent to the



client 2 linked to the external network without confidentiality being violated.

When circulation to the next circulation client 2 is disabled, the aforementioned circulation client 2 or transmitting client 2 sends the report file to another circulation client 2 or transmitting client 2 notifying that circulation is disabled. While document files are circulated among client 2 without passing through the circulation management server, each client 2 is allowed to identify the client 2 where circulation is disabled.

When circulation is disabled in the next circulation client 2, a file can be circulated by skipping the aforementioned next circulation client 2 or can be circulated to a proxy client 2 of the next circulation client 2. This eliminates the possibility of delayed circulation. Moreover, since free selection between them is permitted, quick circulation is ensured based on the selection in conformity to a particular situation.

Further, the aforementioned circulation client 2 adds a correction of the aforementioned document file to the aforementioned circulation information file as correction information, and transmits it to the next circulation client 2. While document files are circulated among clients 2

without passing through circulation management server, the details of the correction can be identified by each client 2.

Moreover, the aforementioned client 2 allows the transmission button or storage button to be displayed on the display unit 7, and permits transmission to the next circulation client 2 or storage location according to the aforementioned button operation. This makes it possible to perform an intuitive operation and prevents incorrect transmission, thereby improving the reliability of the work flow system.

#### **EFFECTS OF THE INVENTION**

The aforementioned arrangement according to the present invention eliminates the need of circulation management by the server and reduces the server load by circulation of a document file among clients without passing through circulation management server. Moreover, a circulation network immune to the restriction by the Firewall can be configured for the clients connected to the different LANs and the Internet, and circulation of a document file is facilitated.

In the present invention, a circulation information file is sent together with document file, thereby permitting

circulation of a document file among clients without passing through circulation management server. Moreover, inclusion of a great variety of information in the circulation information file provides functions equal to or greater than those of the work flow system where circulation is managed by a server.

In the present invention, a transmission completion report is sent to another client notifying that the document file has been sent to the next client. So while a document file is circulated among clients without passing through circulation management server, the status of circulation can be identified by each client.

In the present invention, a circulation completion report is sent to another client notifying that circulation has terminated. So while a document file is circulated among clients without passing through circulation management server, the status of circulation can be identified by each client.

Further, according to the present invention, a transmission completion report to the server is sent to the server notifying that a document file has been sent to the next client, whereby the status of circulation can be identified by the server which does not provide manage

circulation management. At the same time, the status of circulation can be sent back in response to the inquiry from clients.

In identification of the aforementioned status of circulation, each of the aforementioned report files is sent by electronic mail or the like. This makes it possible to configure a circulation network without being restricted to by the Firewall, for the client connected to the different LANs or the Internet, and to facilitate circulation of a document file.

According to the present invention, a document file to be sent is encrypted, thereby ensuring circulation the document file without confidentiality being violated for the client connected to an external network.

Further, according to the present invention, a circulation information file is sent together with a document file, thereby allowing circulation of a document file among clients without passing through a circulation management server. Moreover, when a transmission button display means, storage button display means, verification result input means, prompt message display means, transmission completion report means or transmission document encryption means is configured in a client, it is possible to provide functions

equal to or greater than those of the work flow system where circulation is managed by a server.